now was foremost with all polar expeditions, must recede before the far more important scientific questions. But these questions cannot be answered before all nations that claim a place at the head of civilisation leave aside all national rivalry, and resolve to make progress together in this direction. To obtain decisive scientific results, a number of simultaneous expeditions are absolutely necessary, and their object must be to collect or construct tables of yearly observations at different points round the pole, but their instruments and method of observation should be exactly alike. Only when this is done will the materials be furnished for the solution of those great problems of nature which are now mysteriously enwrapped by Arctic ice; only then will we reap the benefit of that enormous capital of labour, efforts, sufferings, and money which until now have been wasted in the polar district.

With regard to the means to reach the highest latitude, the camp of explorers is divided into two; some are in favour of ships, others expect everything from sledges. As long as it is the *principal* object of an expedition to reach high latitudes, sledges are doubtless preferable, but when higher results are aimed at, only ships can give the necessary basis to work upon. It is a great illusion to imagine that both can be perfectly united; on the contrary, one will always have to be subservient to the other, and they will generally be hindrances to each other.

Finally, Lieut. Weyprecht tenders his thanks to the officers of the expedition, whose untiring efforts and energy, frequently under the most difficult and sometimes the most dangerous circumstances, alone made it possible to present the scientific world at home with the above data of observations and results.

SCIENTIFIC SERIALS

THE *Journal of the Chemical Society* for February 1875 contains two original papers by Mr. A. H. Church. The first is on the composition of autunite. The recent discovery of a new locality in Cornwall for autunite induced Mr. Church to make a fresh examination of this mineral species. The quantity at his disposal was rather small, but as a remarkable peculiarity concerning the condition of the water in this mineral presented itself, the author availed himself of two fine French specimens. The Cornish specimens occurred in thin isolated rhombic tables, translucent to sub-transparent, and were sulphur-yellow. We then have a minute description of the analysis made, and in conclusion Mr. Church finds the formula of autunite, as it exists in the unaltered crystals, to be $\left.\begin{matrix}U_2O_3\\CaO\end{matrix}\right\} P_2O_5 . 10H_2O$, whereas autunite dried in vacuo is $\left.\begin{matrix}U_2O_3\\CaO\end{matrix}\right\} P_2O_5 . 2H_2O$. Upon examination of the closely allied uranium copper phosphate, *torbernite*, it did not show analogous results, and the author found the formula of torbernite to be $\left.\begin{matrix}U_2O_3\\CuO\end{matrix}\right\} P_2O_5 . 8H_2O$ and $\left.\begin{matrix}U_2O_3\\CuO\end{matrix}\right\} P_2O_5 . 2H_2O$ respectively; the latter, if the mineral is dried at 100°. Mr. Church considers, in conclusion, that there are cases in which the drying of minerals in vacuo removes essential water, and not accidental moisture only; and he further believes that absolutely dry air does, in still rarer instances, effect a similar alteration.—The second paper is on the action of baryta on oil of cloves. Considerable differences existing amongst chemists on the action of caustic baryta on eugenol, the author repeated experiments he had made some time ago on a larger scale, and with eugenol from oil of cloves of ascertained genuineness. The author first gives a description of experiments as to the physical characters of pure eugenol itself, and of the terpine with which it is associated in clove oil. We then come to the experiments with baryta, and their result was the conclusion that the action of baryta on eugenol is not a precise or definite one; that a greater part of the eugenol is carbonised and destroyed, and that from the products of such destruction a minute proportion of the remaining eugenol receives an addition of CH_2, becoming thereby converted partly into methyl-eugenol and partly into another body of the same empirical formula, and possibly isomeric with the ether. It is clear, therefore, that none of the former conclusions as to the nature of the action of baryta on eugenol are correct.—The remainder of the journal is dedicated to abstracts of papers published in other journals, many of which have already been noticed in these columns.

American Journal of Science and Arts, February.—The first paper in this number is Prof. Asa Gray's address on Jeffries Wyman at the Memorial Meeting of the Boston Society of Natural History, Oct. 7, 1874, to which, as well as to the subject of it, we have already referred.—On some points in the geology of the Blue Ridge of Virginia, a paper by Mr. W. M. Fontaine, is concluded in this number.—Mr. J. D. Dana reviews Dr. Sterry Hunt's "Chemical and Geological Essays," and Prof. Asay Gray contributes a short paper on the question, "Do varieties wear out?" The conclusion which he reaches we gave in a recent number (vol. xi. p. 334). In "Communications from the laboratory of Williams College," Mr. Ira Remsen treats of (1) the formation of paratoluic acid from parasulphotoluenic acid; (2) nitro-parasulphobenzoic acid; and (3) the action of potassium on ethyl succinate.—Another chemical paper is by Mr. M. Carey Lea on the detection of hydrocyanic acid.—M. A. E. Verrill sends his thirtieth contribution to zoology, from the museum of Yale College; it treats of the gigantic cephalopods of the North Atlantic, and is illustrated with some good cuts.—Among the smaller notes is a useful summary of the results obtained at twenty-six transit stations, twenty in the northern and six in the southern hemisphere.

Transactions of the Geological Society of Manchester, vol. xiii., part 7.—The papers in this part are—the President's (Prof. W. Boyd Dawkins) address on the most important additions during 1873-74 to our knowledge in those departments of geology that relate to mining, engineering, and terrestrial physics; "Fish Remains from the Coal Measures," by Mr. John Aitken, F.G.S.; "Geology of the Parish of Halifax," by Mr. James Spencer.

Memorie della Soc eta degli Spettrocopisti Italiani, Dec. 1874.—Father Secchi writes on the physical study of the comets Coggia and Tempel 1874. He appears to have spectroscopically examined these comets on every opportunity, and to have compared their spectra with a Geissler's tube in front of the object-glass. He found the spectra of a hydrocarbon gas did not correspond with that of the comet; the brightest band of the spectrum of HC_2 is in the blue, while that of the gas CO or CO_2 is in the green, just as in Coggia's comet. On the other hand, the blue band is the brightest in the spectrum of Tempel's comet; and Secchi therefore attributes its light to a hydrocarbon. The nucleus appears to have given off polarised light, and also the surrounding portions of the comet. On July 9 the continuous spectrum of the nucleus appeared broken for a short distance on the red side of each of the hydrocarbon bands. On Sept. 5 Borrelly's comet appeared to have a number of bright points of nuclei dispersed throughout the comet.

Astronomische Nachrichten, No. 2,021.—Julius Schmidt communicates the observations on the number of sun-spots seen every available day at Athens. The average number of groups in January seems to be about five; in April it had decreased to two, and this average remained nearly constant throughout the remainder of the year. Position observations of Coggia's comet, by J. Dreyer, of Birr Castle, and the discovery of Planet 141, by Paul Henry, appear in this number. The transit of Venus appears to have been seen well at Java, by Metzger; the different appearances at various times during the transit are given. The eclipse of the sun was observed at Leipzig in January. It appears from the observations of the ends of the eclipse that the last contact was seen with the larger apertures before it was so seen with the smaller one.

Zeitschrift der Oesterreichischen Gesellschaft für Meteorologie, Jan. 15.—The first paper is a contribution by Dr. Hildebrandsson to the question of the condition of vapour in the atmosphere, founded on researches made by him and Prof. Rosen some years ago, and not before published, to his knowledge, beyond Sweden. Le Roy started, and Saussure accepted the theory, that air dissolves water or vapour as a fluid dissolves a salt. Wallerius, de Luc, and Dalton, on the other hand, were of opinion that vapour is formed through the action of heat exactly in the same way in a vacuum as in air. Since the demonstrations of Regnault, the latter view has been generally adopted. By experiments resembling those of Rudberg and Regnault, Dr. Hildebrandsson and Prof. Rosen came to the following conclusions:—1. If a gas or vapour of water be brought (mechanically or by evaporation) into a volume of gas, this volume is immediately compressed or shoved aside until the difference in pressure is annulled. 2. If a gas or vapour of water be taken (mechanically or by condensation) from a volume of gas, this volume of gas rushes in from all sides to fill up the vacuum or equalise pressure. The condensation of vapour therefore doubtless plays a large part in the origin and propagation of storms,

not only by the liberation of heat, but also by the sudden diminution of pressure, which causes an inflow of air and vapour. 3. When different gases and vapours are at rest next each other, they mix and diffuse thoroughly till the mixture becomes homogeneous. Hence it follows: (1) That the permanent gases, of which air consists, are not independent atmospheres, but thoroughly penetrate each other. This result is confirmed by all experiments, which show the composition of the air at all attainable heights to be the same. (2) That the ceaseless evaporations and condensations render impossible the existence of an independent vapour atmosphere, or of a homogeneous mixture of vapour with the permanent gases, and cause a rapid decrease of vapour pressure with increase of height. (3) It is not permissible to subtract the tension of vapour from the height of the barometer, in order to find the pressure of dry air.—An article follows in the *Kleinere Mittheilungen* on the law of Dalton, respecting the independence of gas atmospheres, and on the composition of the air at great heights. The researches of Maxwell, Boltzmann, and especially of Stefan, lead to these results: The definitive equilibrium of a gas is determined by the law of Dalton, but not the manner in which the gas disposes itself before it has come to equilibrium. According to that law the mixture of two gases would take place with great rapidity, while experience shows the process to be very slow. The subtraction of vapour-tension from the height of the barometer is a false application of the law, and a reading thus corrected has a purely local signification in the narrowest sense.

THE four numbers of the *Nuovo Giornale Botanico Italiano* for 1874 contain the results of a good deal of work done by Italian botanists, though several of the papers are by Russians, and are printed in French. A large proportion of the papers in this vol. vi. relate to Cryptogams; including one by Prof. Tchistiakoff on the development of the sporangia and spores in Polypodiaceæ; by G. Arcangeli, on certain Fungi of the neighbourhood of Leghorn, and on Algæ of the group Cæloblastæ; by N. Sarokin, on the development of *Hormidium varium*, an Alga belonging to the family Ulothricaceæ; and by Prof. Tchistiakoff on the development of the spores of *Equisetum limosum* and *Lycopodium alpinum*, the subject being treated both in this and the previous paper by the same writer as a contribution to the history of the vegetable cell.—V. Cesati has a paper on hybridisation in the genus *Achillæa*, and on the gemmiparous leaves of *Cardamine pratensis*. There is a useful bibliography in each number, and we have a report of the proceedings of the Botanical Congress held at Lucca in 1843.

SOCIETIES AND ACADEMIES

LONDON

Royal Society, March 18.—"Report on Observations of the Transit of Venus made at Luxor, Upper Egypt, 19th December, 1874." By Vice-Admiral E. Ommanney, C.B., F.R.S.

"Preliminary Abstract of Approximate Mean Results with the Invariable Pendulums Nos. 4 and 1821, in continuation of the Abstract published in vol. xix. of the Proceedings." By Captain W. J. Heaviside, R.E. Communicated by Professor Stokes, Sec. R.S.

Linnean Society, March 18.—Dr. G. J. Allmann, F.R.S., president, in the chair.—Mr. Rothery exhibited a convenient apparatus for drying plants when on a walking expedition.—The following papers were read:—On thirty-one new species of marine Planarians from the Eastern Seas, by Dr. Collingwood. On the resemblances of Ichthyosaurian bones with the bones of other animals, by Mr. H. G. Seeley.

Geological Society, March 10.—Mr. John Evans, V.P.R.S. president, in the chair.—The following communication was read:—"The Rocks of the Mining Districts of Cornwall, and their relation to Metalliferous Deposits," by Mr. John Arthur Phillips, M.I.C.E. In this paper the author adduced numerous facts observed by him in the examination of the rocks of the mining districts of Cornwall which led him to the following conclusions:—The clay-slates of Cornwall differ materially in composition, but no rearrangement of their constituents could result in the production of granite. Some of the "greenstones" of the Geological Survey Map are volcanic rocks contemporaneous with the slates among which they are found, whilst others are hornblendic slates, diorites, &c. Granites and elvans having a similar chemical and mineralogical composition were probably derived from the same source; but the volume of the bubbles in the fluid-cavities of both having no constant relation to the amount of liquid present, do not afford any reliable data from which to calculate the temperatures at which these rocks were respectively formed. The stone-cavities of elvans, and probably of some other rocks, are often the results of the irregular contraction, before the solidification of the base, of imbedded crystals of quartz. In rocks having a glassy base, glass-cavities will be produced. The vein-fissures of the tin- and copper-bearing lodes of Cornwall were produced by forces acting after the solidification of the elvans, but in the same general direction as those which caused the eruption of the latter; and these fissures were afterwards filled with minerals deposited by chemical action from water and aqueous vapours circulating through them, but not necessarily at a high temperature. How far these deposits were produced by water rising from below or influenced by lateral percolation cannot be determined; but the effects produced on the contents of veins by the nature of the enclosing rock, and the occurrence of deposits of ore parallel with the line of dip of the adjoining country, lead to the conclusion that lateral infiltrations must have materially influenced the results. Contact-deposits and "stockwerks" have been formed by analogous chemical action, set up in fissures resulting from the junction of dissimilar rocks, or in fractures produced during the upheaval of partially consolidated eruptive masses. The alteration produced in stratified deposits in the vicinity of eruptive rocks is probably often due to similar percolations. It is not improbable that quartz may sometimes retain a certain amount of plasticity after it has assumed a crystalline form.

Zoological Society, March 16.—Dr. A. Günther, F.R.S., V.P., in the chair.—Mr. Howard Saunders exhibited a specimen of a Gull obtained by Mr. Gervaise Mathew, R.N., at Magdalena Bay, Lower California, closely resembling *Larus fuscus*, a species hitherto unrecorded from the New World.—A letter was read, addressed to the Secretary by Capt. John Biddulph, containing remarks on the Wild Sheep met with during his recent journey to Yarkand.—A letter was read from the Rev. J. S. Whitmee, of Samoa, South Pacific, giving particulars as to the occurrence of the Palolo (*Palola viridis*) on the shores of that island in 1874.—Prof. W. H. Flower, F.R.S., read a memoir on the anatomy and affinities of the Musk Deer (*Moschus moschiferus*). After an exhaustive account of the structure of this animal, based on the examination of a specimen that had recently died in the Society's Gardens, Prof. Flower came to the conclusion that it was most nearly related to the *Cervidæ*, and might be placed within the limits of that family.—A communication was read from the Rev. O. Pickard-Cambridge, in which he gave the description of twenty-four new species of spiders of the genus *Erigone*, from France, Corsica, Sicily, Spain, Morocco, and Algiers.—Dr. A. Günther, F.R.S., read a second report on the collections of Indian Reptiles recently obtained by the British Museum, and described several species as new to science.—A paper was read by Messrs. Sclater and Salvin, containing an account of the birds collected by Mr. A. Goering on the Sierra Nevada of Merida, and at San Cristoval in Venezuela in 1874.—A communication was read from M. L. Taczanowski, containing the description of a new species of grouse from the mountains of Georgia, allied to the Black Grouse, which was proposed to be called *Lyrurus mokosiewiczi*.—Mr. A. G. Butler read the descriptions of a large number of new species of *Sphingidæ*.—Sir Victor Brooke gave a notice of a Deer allied to the Fallow Deer from Mesopotamia, of which he had lately received specimens from Mr. P. J. Robertson. H.B.M. Vice-Consul at Bussorah. For this new form, which is found in the jungles along the valley of the Euphrates, Sir V. Brooke proposed the name *Cervus mesopotamicus*.

Meteorological Society, March 17.—Dr. R. J. Mann, president, in the chair.—The following communications were read:—On the climate of Patras, Greece, during 1873, by Rev. Herbert A. Boys. This year was remarkable for sudden fluctuations and great ranges of temperature; the rainfall, amounting to 26·15 inches, was about the average, but the number of wet days (for that place) was great. The summer months, however, were very dry, there being only five days in June, none in July, and one in August, on which rain fell. There was a period of sixty-eight days from June 24 to August 30, without any rain whatever.—On ozone, by Mr. Francis E. Twemlow. This paper gives an account of nearly all that is known of this remarkable substance. An interesting discussion followed the reading of the paper, bearing chiefly upon the amount of oxygen in the